Environmental Restoration

Industrial Sites

The close of World War II saw the United States usher in a new generation of technology. The post-war society experienced a wide range of technological breakthroughs, from dishwashers to television, changing the face of American culture. This progress was also evident in the burgeoning technology of atomic weaponry. After the Trinity test was conducted on July 16, 1945, in New Mexico, the United States began aggressively pursuing the advancement of nuclear weapons. By the end of 1948, the United States had conducted several nuclear weapons tests on small, remote islands in the Pacific Ocean. In 1950, President Truman established the Nevada Proving Ground located 65 miles northwest of Las Vegas, to bring nuclear testing to United States soil. Now known as the Nevada Test Site (NTS), it is an approximately 1,375 square mile federally-restricted area where 928 underground and atmospheric nuclear and conventional weapons tests were conducted over the course of approximately 40 years.

President Truman established the Nevada Proving Ground in 1950.

To address the environmental liabilities associated with nuclear weapons production and testing at the NTS and across the nation, the U.S. Department of Energy (DOE) established the Environmental Management Program at DOE sites around the country. The Environmental Management Program is the world's largest cleanup effort. As part of that effort, the DOE Nevada Operations Office (DOE/NV) is responsible for identifying the nature and extent of contamination; determining its potential risk to the public and the environment; and performing the necessary corrective actions in compliance with guidelines and requirements. These responsibilities are delegated to the DOE/NV Environmental Restoration Division.

Field laboratories such as this, circa 1963, left behind debris that would later become industrial sites.

Building 650 Leachfield is an industrial site at the NTS.

The DOE/NV Environmental Restoration Division responsibilities are grouped into the following projects:
The **Underground Test Area Project**, to study the effects of underground nuclear testing on groundwater beneath the NTS; the **Soils Project**, to reduce risk to human health and the environment by characterizing and assessing affected soil areas, then recommending corrective actions;

Debris at an industrial site.

the **Offsites Project**, to address sites where nuclear weapons tests were conducted in the United States beyond the boundaries of the NTS; and the **Industrial Sites Project**, to assess and clean up impacted sites that are the result or by-product of past testing and support activities.

Industrial sites, located throughout the NTS and the Tonopah Test Range, are investigated to identify any hazardous waste constituents that may be present in accordance with the *Resource Conservation and Recovery Act* (RCRA) of 1976. RCRA was designed to control the creation, transportation, treatment, storage, and disposal of hazardous waste and provides guidelines for hazardous waste classification. After hazardous waste constituents are identified at an industrial site, a corrective action is selected and implemented.

A sewage lagoon at the Nevada Test Site

Corrective actions at industrial sites are completed in accordance with the *Federal Facility Agreement and Consent Order* (FFACO), a 1996 agreement between the State of Nevada's Division of Environmental Protection (NDEP), the DOE, and the U.S. Department of Defense. The FFACO outlines a schedule of cleanup and monitoring commitments for sites contaminated by DOE and U.S. Department of Defense activities.

Industrial sites listed in the FFACO first undergo an historical site investigation. Historical information is used to evaluate and reprioritize Corrective Action Units so that corrective actions are optimized. In addition to identifying known periods of historical activity, DOE also evaluates current conditions and potential contaminants at industrial sites. Sometimes, these investigations lead to the discovery of possible new industrial sites, which are then explored and evaluated in coordination with NDEP, to determine whether or not they should be added to the FFACO.

Industrial sites generally consist of sites containing discarded drums, batteries, lead bricks, and other debris. These sites are cleaned up as part of the "housekeeping" process and involve the simple removal of the debris.

Aboveground storage tanks are a SAFER industrial site.

For some industrial sites, the investigation to determine a corrective action for site closure may be eliminated when enough information exists about the nature and extent of contamination. This process, known as the Streamlined Approach for Environmental Restoration (SAFER), allows uncomplicated industrial sites, such as aboveground storage tanks and small spills, to be cleaned up in a timelier manner.

Investigating an industrial site.

Other industrial sites such as septic tanks, leachfields, sewage lagoons, waste dumps, mud pits, and facilities used in testing and support activities are more complex to clean and are addressed by a lengthier and sometimes expensive process called "complex closure." As is the case with all Environmental Management clean up sites, DOE/NV does not proceed with complex closure activities until it has coordinated an approach with the State of Nevada. Complex closure begins with a DOE investigation of the industrial site followed by recommendations for possible types of corrective actions. Next, a corrective action is chosen and a plan is devised to implement that corrective action. After the plan is implemented, DOE prepares a closure report for the industrial site. Some closure reports may include monitoring requirements for the site, if necessary. Once DOE/NV and NDEP are in agreement, NDEP issues a notice of completion, marking the end of the complex closure process.

Corrective actions applied to industrial sites may also include "clean closure," which entails excavation and removal of all contamination. Based on projected limited future land use restrictions at the NTS that have been established in accordance with the State of Nevada, some industrial sites may be closed and covered with an engineered cap, leaving the waste in place. Often, industrial sites are closed through a combination of removal, clean up, and closure in place.

After an industrial site has been closed, the Industrial Sites Project conducts post-closure monitoring of the site as needed, which includes periodic collection of measurements and/or samples from monitoring wells. Monitoring activities are stipulated in the Post-Closure Care Permit, which provides guidelines for the inspection and maintenance of clean-up systems depending on the specified closure action. Post-closure monitoring continues for a pre-determined period of time negotiated by DOE/NV and the State of Nevada under its RCRA authority.

The ultimate goal of the Industrial Sites Project is to complete all corrective actions and ensure that all necessary long-term surveillance and maintenance programs are in place to protect the safety of the public and the environment.

Excavation of an industrial site at Tonopah Test Range.

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